MORNSUN®

ED_S-1W Series

1W, FIXED INPUT, ISOLATED & UNREGULATED TWIN INDEPENDENT OUTPUT DC-DC CONVERTER

RoHS

FEATURES

Efficiency up to 79%
Optimized Volume
Twin Output Voltage
3KVDC Isolation
Temperature Range: -40°C to +85°C
Industry Standard Pinout
No Heat sink Required
No External Component Required
Internal SMD construction
PCB Mounting
RoHS Compliance

APPLICATIONS

The ED_S-1W Series are specially designed for applications where a group of polar power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

1) Where the voltage of the input power supply is fixed (voltage variation ≤±10%);

2) Where isolation is necessary between input and output (isolation voltage ≤3000VDC);

3) Where the regulation of the output voltage and the output ripple and noise are not demanding.

Such as: purely digital circuits, ordinary low frequency analog circuits and IGBT power device driven circuits, etc.

MODEL SELECTION

ED0505S-1W

- Rated Power
- Package Style
- Output Voltage
- Input Voltage
- Product Series

PRODUCT PROGRAM

Part Number	Input Voltage (VDC) Nominal	Input Voltage (VDC) Range	Output Vo1, Vo2 (VDC)	Output Io1, Io2 (mA) Max	Output Io1, Io2 (mA) Min	Efficiency (%, Typ)	Package Style
ED0505S -1W	5	4.5-5.5	5	100	10	72	SIP
ED0512S-1W			12	42	4	78	SIP
ED0515S-1W			15	33	3	78	SIP
ED1205S-1W	12	10.8-13.2	5	100	10	74	SIP
ED1212S-1W			12	42	4	79	SIP
ED1215S-1W			15	33	3	79	SIP
ED2405S-1W	24	21.6-26.4	5	100	10	74	SIP
ED2412S-1W			12	42	4	76	SIP

Note:
Models listed with strike-through text have been officially discontinued.

ISOLATION SPECIFICATIONS

Item	Test condition	Min	Typ	Max	Units
Isolation voltage(Vin/Vout)	Tested for 1 minute and 1 mA max	3000	--	--	VDC
Isolation voltage (Vo1/Vo2)	Tested for 1 minute and 1 mA max	3000	--	--	
Isolation resistance (Vin/Vout)	Test at 500VDC	1000	--	--	MΩ
Isolation resistance (Vo1/Vo2)	Test at 500VDC	1000	--	--	
Isolation capacitance(Vin/Vout)		20	90	--	pF
Isolation capacitance(Vo1/Vo2)		20	90	--	

OUTPUT SPECIFICATIONS

Item	Test condition	Min	Typ	Max	Units
Output power		0.1	--	1	W
Line regulation	For Vin change of 1%	--	--	±1.2	--
Load regulation	10% to 100% load(5V output)	--	10	15	%
	10% to 100% load(9V output)	--	8.3	15	
	10% to 100% load(12V output)	--	6.8	15	
	10% to 100% load(15V output)	--	6.3	15	
Output voltage accuracy		See tolerance envelope graph			
Temperature drift	100% full load	--	--	0.03	%/°C
Ripple& Noise*	20MHz Bandwidth	--	100	150	mVp-p
Switching frequency	Full load, nominal input	--	100	--	KHz

*Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.
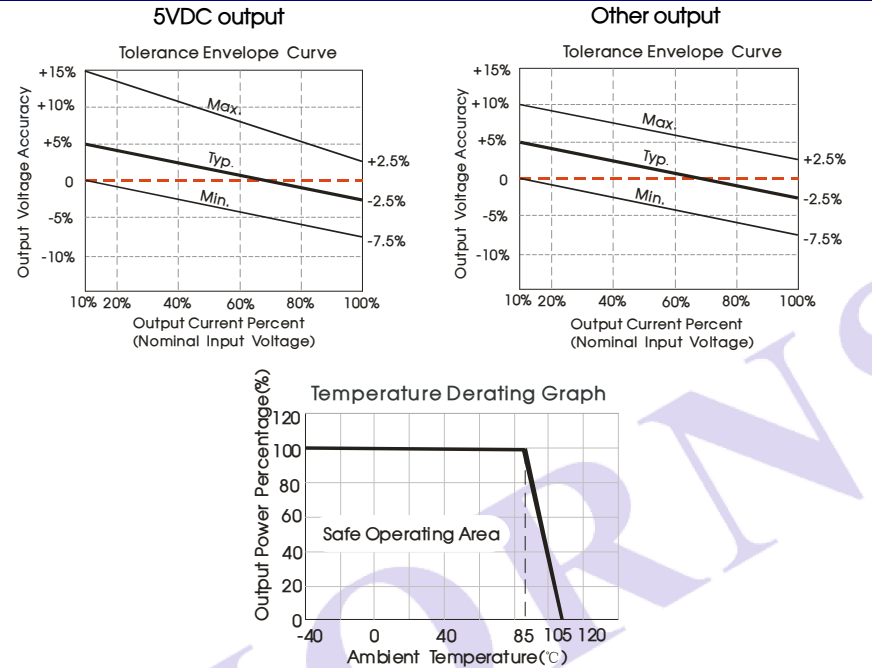
Note:
1. All specifications measured at TA=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
2. See below recommended circuits for more details.
3. Operation under minimum load will not damage the converter; However, they may not meet all specification listed, and that will reduce the life of product.
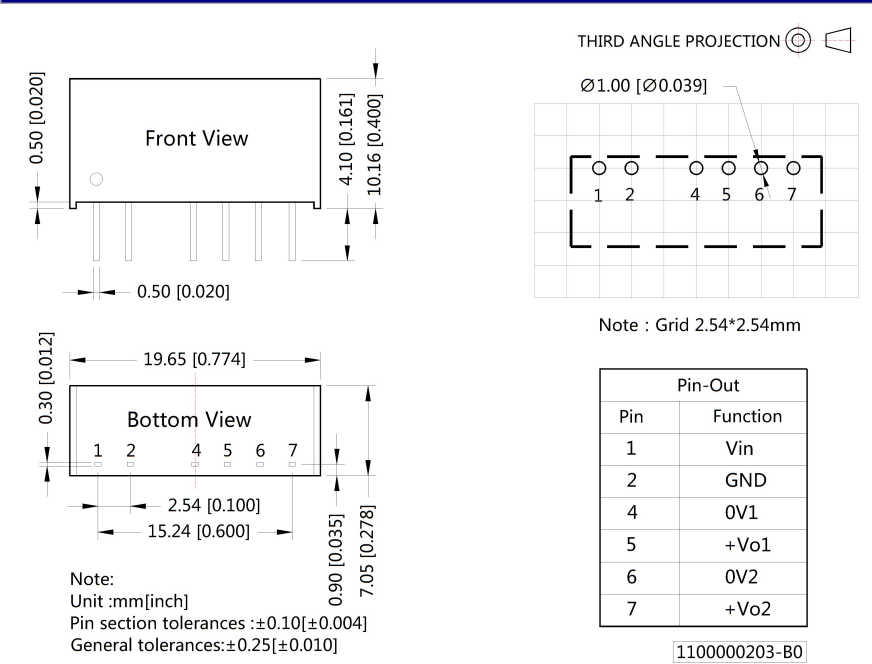
COMMON SPECIFICATION

Item	Test condition	Min	Typ	Max	Units
Storage humidity range		--	--	95	%
Operation temp. range		-40	--	85	
Storage temp. range		-55	--	125	°C
Lead temperature	1.5mm from case for 10 seconds	--	--	300	
Temp. rise at full load		--	15	25	
Short circuit protection*		--	--	1	s
Cooling		Free air convection			
Case material		Plastic (UL94-V0)			
Weight		--	2.1	--	g
MTBF		3500	--	--	K hours

*Supply voltage must be discontinued at the end of short circuit duration.

TYPICAL CHARECTERISTICS

5VDC output

Tolerance Envelope Curve

Other output

Tolerance Envelope Curve

Temperature Derating Graph

OUTLINE DIMENSIONS& RECOMMENDED FOOTPRINT

Front View

Bottom View

Note:
Unit :mm[inch]
Pin section tolerances :±0.10[±0.004]
General tolerances:±0.25[±0.010]

THIRD ANGLE PROJECTION

Ø1.00 [Ø0.039]

Note : Grid 2.54*2.54mm

Pin-Out	
Pin	Function
1	Vin
2	GND
4	0V1
5	+Vo1
6	0V2
7	+Vo2

1100000203-B0

APPLICATION NOTE

Requirement On Output Load

To ensure this module can operate efficiently and reliably, a minimum load is specified for this kind of DC/DC converter in addition to a maximum load (namely full load). During operation, make sure the specified range of input voltage is not exceeded, the minimum output load *could not be less than 10% of the full load*. If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load.

Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against over-current and short-circuits. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

Filtering

In some circuits which are sensitive to noise and ripple, a filtering capacitor may be added to the DC/DC output end and input end to reduce the noise and ripple. However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor sees the external capacitor table.

EXTERNAL CAPACITOR TABLE(TABLE 1)

| Vin(VDC)	Cin(uF)	Cout(uF)	Vout(VDC)
5	4.7	5	4.7
12	2.2	9	2.2
24	1	12	1
--	--	15	0.47

It's not recommended to connect any external capacitor in the application field with less than 0.5 watt output.

To get an extremely low ripple, an "LC" filtering network may be connected to the input and output ends of the DC/DC converter, which may produce a more significant filtering effect. It should also be noted that the inductance and the frequency of the "LC" filtering network should be staggered with the DC/DC frequency to avoid mutual interference (see figure 1).

(Figure 1)
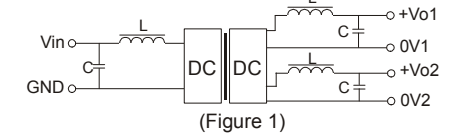
Output Voltage Regulation and Over-voltage Protection Circuit

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (see Figure 2).

(Figure 2)
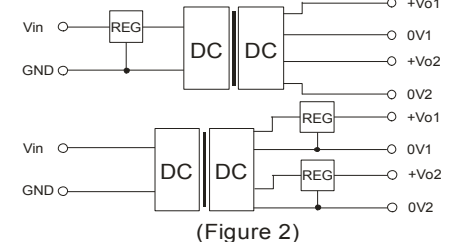
No parallel connection or plug and play.